

**BIOL 3170 3.0 – Population Ecology**

**Population Ecology**, is the study of population dynamics of species, and it focuses on regulation, life history biology, patterns of abundance, and conservation and extinction.

**Course Material**

We will consider: Field Ecology, Population Regulation, Management, Viability, Behavioural Ecology, Population Outbreaks, Management, Dispersal, Sinks and Traps, Competition, Predation, Parasitism, Territoriality, Invasive Species, and Conservation!

**Course Instructor:** Professor Alex Mills, Room 134 Chemistry Building  
[ammills@yorku.ca](mailto:ammills@yorku.ca) (include “BIOL 3170” in subject line)  
416-736-2100 ext. 33609

**Office Hours:** Tuesday and Friday, 9 to 11 am

There will be two **TAs** for this course: To be advised in September

**Website:** The course will be managed through a *Moodle* site. Please log in at:  
<https://moodle.yorku.ca/moodle/>

**There is no Required Text:** Examinable materials will be posted on the course website. These materials will include PowerPoint presentations made in class, as well as PDF files of most of the articles referred to. There may be additional materials posted (e.g MS Word documents summarizing some context). Note, material presented in lecture, including notes made on blackboard, impromptu question and answer exchanges, etc, are also examinable material. They will not be posted on the website. (So therefore, come to class and make notes).

I have placed on 2-hour reserve in the Steacie Library a standard text on population biology: *Introduction to Population Biology* by Dick Neal, 2003.

**Important Dates:**

First Class is Wednesday Sep 5<sup>th</sup>.

Last day to DROP the course without a grade being submitted is Nov 9<sup>th</sup>.

## **Lab Schedule**

There are three multiple-week field projects:

Lab 1 – Snail Lab (3 weeks),

Lab 2 – Chickadee Lab (4 weeks),

Lab 3 – (2-3 weeks)

The Snail Lab includes 2 weeks of field data collection and a third week where results are presented as posters. The Chickadee Lab includes 2-3 weeks of field data collection, and results are presented in seminars. The final lab will likely include a day of sampling, a day of analysis, and results that will be submitted as a written report.

The snail and chickadee projects at least require visits to locations on campus—rain or shine! Dress with appropriate jackets, jeans, boots etc. If extreme weather prohibits a field trip, then an indoor lab exercise will be done instead.

The goals of the labs are to conduct ecological field research to learn hands-on how population ecology is done by population biologists and to learn how to write-up and present the results of your study using similar tools to professional scientists.

Attendance will be taken at labs and students should be prepared to provide legitimate doctor's notes to explain absences. Students who choose not to attend the data analysis/writing labs should not expect the TA to provide this information at any other time or by email.

Students are allowed to work in groups on lab projects for data collection, analysis and write-up. It is up to students working in groups to share the workload, meet internal deadlines, and check the quality of each other's work.

<b>September 12</b>	<b>Intro to Field Ecology</b>
September 17-20	1. Snail Lab (Field Work)
September 24-27	1. Snail Lab (Field Work)
October 1-4	1. Snail Posters
October 8	Thanksgiving – No Monday lab
October 10-15	2. Chickadee Lab (Field Work)
October 17-22	2. Chickadee Lab (Field Work)
October 24-29	2. Chickadees (Field & Analysis)
October 31, November 2	No Wednesday or Friday labs
November 5-8	2. Chickadee Lab Seminars
November 12-15	3. (sampling)
November 21	3. (analysis)
November 28	3. Report

**Is there a required Lab Manual?** No**Evaluation:**

Labs (Snail Lab)	9%	
(Chickadee Lab)	12%	30%
(Lab 3)	9%	
Midterm Test ( <u>October 19</u> )		25%
Exam (December exam period)		45%

A penalty of 10% per day will apply to all material handed in late.

**Learning Objectives:** Students will be able to...*Area 1. Fundamental Understanding:*

- Use terminology appropriate to the field of population ecology
- Distinguish different models of growth
- Recognize the main parameters and major formulae for describing population growth
- Derive the formula and employ the formula for mark-recapture analysis
- Distinguish between r- and K-selected traits and connect them to life history strategies and growth patterns
- Demonstrate a knowledge of the effects of competition on population dynamics
- Demonstrate a knowledge of the effects of predation on population dynamics
- Demonstrate a knowledge of the effects of parasitism on population dynamics
- Demonstrate a knowledge of the effects of mutualism on population dynamics
- Apply the principles of population ecology to issues of conservation
- Interpret population patterns in terms of evolutionary selective forces and evolutionary mechanisms applicable to small populations
- Use natural history knowledge

*Area 2. Critical Thinking Skills:*

- Employ case studies as exemplars of biological concepts
- Draw generalized concepts from the results of particular scientific studies or experiments (inductive reasoning)
- Present arguments that explain evolutionary phenomena such as sexual selection and sexual conflict

- Apply course content to new data sets
- Employ a metaphor for conveying the nature of time and its relationship to evolutionary milestones

*Area 3. Problem Solving Skills:*

- Apply principles from the scientific literature to new fact situations
- Employ diverse field methods for collecting field data that is sought to address particular biological questions

*Area 4. Effective Communication:*

- On tests and exams, clearly construct written answers to questions and clearly construct written explanations or arguments for scenarios or fact situations

**Please read these FAQs!**

**Can I treat this course as a distance course?** It is not designed as a distance course. It is not a course where you have to simply memorize material from a textbook or simply memorize PowerPoint slides! Some of the material will only be delivered during lecture. If you skip class, you will suffer accordingly, but that is up to you.

**Then what is “the whole course”?** Material delivered during lecture (therefore take notes!), PowerPoints posted on-line, and anything else indicated either in class or on the course website. Then, of course, there are also the labs.

**Are study notes posted on-line?** PowerPoints used in lecture are posted on-line, usually prior to class, sometimes following class. Remember, these presentations do not constitute the whole course; they need to be understood in conjunction with what is said in class.

**Can I surf the web while in class, or text friends, etc.?** No! It is rude, and it is distracting to fellow students and to me. Avoid temptation by turning off your phones and wireless. Classes are only 50 minutes, and your undivided attention is helpful to you and to me.

**If I miss a test or a lab, can I tell you when it suits me?** Within 24 hours of missing a test, fill out the “Report Absences” form from the course website, and get it to me by delivery or email (or to the lab coordinator in the case of a missed lab). “Problems with my printer” or “problems with my email” do not justify lateness in notifying me (or the lab coordinator in the case of a lab).

**Do you bump marks at the end of the course?** Very rarely; presume that a 79 is a 79, not an 80, and that a 59 is a 59, not a 60! Don't aim for a 49!

### **Accommodations:**

Students who feel that there are extenuating circumstances that may interfere with the successful completion of their exams or other course requirements are encouraged to discuss their concerns with Professor Mills as soon as possible.

Students with physical, learning or psychiatric disabilities who require reasonable accommodations in teaching style or evaluation methods should discuss the matter with Professor Mills early in the term so that appropriate arrangements can be made.

### **Religious Observance Days:**

Should any of the dates for tests or exams pose a conflict with a religious observance day for your particular religion, you must complete an **Examination Accommodation Agreement Form** (available online at Registrar's Office site) and submit it to the instructor **at least 3 weeks before the date of the test or 3 weeks before the start of the examination period.**

### **Academic Honesty:**

York students are required to maintain high standards of academic integrity and are expected to be familiar with and to follow the Senate Policy on Academic Honesty (see <http://www.yorku.ca/secretariat/legislation/senate/acadhone.htm>)

Cheating and plagiarism are major academic offences and carry serious penalties, ranging from a failing grade on the work in question to expulsion from the university. Students should also complete the online tutorial available at that site.

### **More details on missed Tests:**

Students who miss a test or exam due to an illness or emergency must provide supporting documentation to the instructor as soon as possible. Tests and

exams missed on the ground of medical circumstances must be supported by an Attending Physician's Statement, which can be downloaded from: [http://www.registrar.yorku.ca/pdf/petitions/attending\\_physician\\_statement.pdf](http://www.registrar.yorku.ca/pdf/petitions/attending_physician_statement.pdf), or a statement by a psychologist or counsellor. Students are NOT expected to disclose the nature of the illness. The document must specify: 1) date of consultation; 2) contact information (e.g. phone number of the hospital; legible name of the health provider) that would allow verification of the document; 3) a statement that the student would not have been able to attend class (or carry out activities) during the relevant period of time. The documentation must be dated on the same day as the exam or earlier, or it will not be accepted. Appropriate documentation must be submitted to Professor Mills (or the lab coordinator if it is a missed lab; see below) immediately after the test (or lab).

### **Professionalism and Student / Instructor Conduct:**

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect and to refrain from actions disruptive to such a relationship and to the class. It is the responsibility of the instructor to maintain an appropriate academic atmosphere in the lecture hall, and the responsibility of the student to cooperate in that endeavour.

Remember that texting, chatting, and surfing websites during lectures is unprofessional and disruptive. (Abuses may result in a no-laptop policy for all).

I hope to make this course an enjoyable experience for everyone.